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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/649,577	08/26/2003	Douglas A. Hawks	0140153	5977
25700	7590	07/25/2006	EXAMINER	
FARJAMI & FARJAMI LLP 26522 LA ALAMEDA AVENUE, SUITE 360 MISSION VIEJO, CA 92691			TRINH, MICHAEL MANH	
			ART UNIT	PAPER NUMBER
			2822	

DATE MAILED: 07/25/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/649,577

Applicant(s)

HAWKS ET AL.

Examiner

Michael Trinh

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 May 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8, 16, 17 and 20-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8, 16, 17 and 20-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____.

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DETAILED ACTION

*** This office action is in response to Applicant's Amendment and RCE filed on May 10, 2006. Claims 1-8,16,17,20-27, and 28 are pending, in which claim 28 has been newly added.

*** The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Rejections - 35 USC § 102

1. Claims 1-6,16,20-26,28 are rejected under 35 U.S.C. 102(b) as being anticipated by Roche et al (4,530,152).

Re claim 1, Roche teaches (at Figs 1-5; col 2, line 35 through col 4) a method for forming a package for an electrical device, the method comprising the steps of attaching a removable material 6/7 to a surface of a conductive material (col 2, line 35 through col 3); forming isolated conductive features 3 within said conductive material (Figs 1-3; col 3, lines 10-47); attaching encapsulant 5 to the isolated conductive features 3 and the removable material 6/7 (Fig 1; col 3, line 48 through col 4); and removing the removable material 6/7 from the conductive features 3 and the encapsulant 5 (col 3, line 62 through col 4, line 25). Re claim 2, wherein the forming step further includes patterning by selective removing of a metal deposit using photolithographic technique (col 3, lines 25-43), which photolithographic techniques is conventionally and inherently performed by patterning a surface of the conductive material with a material resistant to an etchant and etching the conductive material with the etchant. Re claim 3, wherein a die attach pad 4 is formed within said conductive material (Figs 2-3). Re claim 4, wherein the device 1 is coupled to said die attach pad 4 (Figs 1,3). Re claim 5, wherein an input/output portion of the device 1 is electrically coupled to said isolated conductive feature 3 (Figs 1,3). Re claim 6, wherein the method further comprises the step of singulating individual packaged devices (Figs 1-3,5; col 4, lines 14-24). Re claim 16, wherein the removable material 6/7 is used and acted as a molding stencil during molding of encapsulant 5 (Fig 1-3; col 3, lines 48-66). Re claim 20, wherein the conductive material of metal deposit comprises a metal frame sheet (Fig 1-5; col 3, lines 10-47). Re claim 21, wherein the conductive material of metal deposit film comprises and acts as a metal leadframe (Figs 1-5; col 3, lines 10-47). Re claim 22, wherein die attach pad 4 is not offset form the isolated conductive features 3 (Figs 2-5). Re claim 23, wherein a single row of connectors 3 is formed around perimeter of the leadframe (Figs 2-5). Re

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claim 24, wherein the metal frame comprise a metal sheet by metal deposition (col 3, lines 10-47; Figs 2-5). Re claim 25, wherein multiple rows of connectors 3 are formed around a peripheral of the metal sheet (Figs 2,3,5). Re claim 26, wherein the removable material 6/7 covers substantially the entire bottom surface of the metal lead frame (Figs 2-5). Re claim 28, Roche teaches (at Figs 1-5; col 2, line 35 through col 4) a method for forming a package for an electrical device, the method comprising the steps of attaching a removable material 6/7 to a surface of a conductive material by metal deposition (col 2, line 35 through col 3) so that it is before one or more isolated conductive features 3 have been formed within the conductive material; forming isolated conductive features 3 within said conductive material (Figs 1-3; col 3, lines 10-47); attaching encapsulant 5 to the isolated conductive features 3 and the removable material 6/7 Fig 1; col 3, line 48 through col 4), wherein the attaching step is performed before a singulation process is performed to separate the package; and removing the removable material 6/7 from the conductive features 2 and the encapsulant 5 (col 3, line 62 through col 4, line 25), wherein the removing the material step is performed before or after the singulation process for separating the package (col 4, lines 14-25).

2. Claims 1-6,16,20-26,27 are rejected under 35 U.S.C. 102(e) as being anticipated by Fjelstad (6,001,671).

Re claim 1, Fjelstad '671 teaches (at Figs 2A-2E,2F, col 5, lines 26-65; Figs 1A-1G-1,1D-3; col 1-5; col 3, line 53 through col 5) a method for forming a package for an electrical device, the method comprising the steps of attaching a removable material (100',115' in Fig 2A; 100 in Fig 1) to a surface of a conductive material 101 (Fig 2A; col 5, lines 26-65); forming isolated conductive features (110' in Figs 2B,2F; 110 in Figs 1B,1D-3) within said conductive material; attaching encapsulant (140' in Fig 2D; 140 in Fig 1E) to the isolated conductive features 110',115',110 and the removable material; and removing the removable material from the conductive features 110',115',110 and the encapsulant (Figs 1E-1F; col 4, line 66 through col 5; Fig 2F, col 5, lines 60-65; Fig 2E, col 5, lines 45-65). Re claim 2, wherein the step of forming isolated conductive pad features includes patterning and selectively etching of a metal deposit layer using photolithographic technique (col 5, lines 26-40; Figs 2A-2B), which photolithographic techniques is inherently performed by patterning a surface of the conductive

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material with a material resistant to an etchant and etching the conductive material with the etchant. Re claim 3, wherein a die attach pad 115' is formed within said conductive material (Figs 2A-2C). Re claim 4, wherein the device 120' is coupled to said die attach pad 115' (Figs 2C). Re claim 5, wherein an input/output portion of the device 120' is electrically coupled to said isolated conductive feature 110' (Figs 2C,2F,1D-3). Re claim 6, wherein the method further comprises the step of singulating individual packaged devices (Figs 1F,1G-2; col 5, lines 10-65). Re claim 16, wherein the removable material 100',100 is used and acted as a molding stencil during molding of encapsulant 140',140 (Fig 1E;2D; col 4, lines 56-65; col 5, lines 26-65). Re claim 20, wherein the conductive material 101',101 of metal deposit comprises a metal frame sheet (Figs 2A-2F,1D-1F). Re claim 21, wherein the conductive material of metal deposit film comprises and acts as a metal leadframe (Figs 2A-2F,1A-1F, Figs 1D-3). Re claim 22, wherein die attach pad 115' is not offset from the isolated conductive features 110' (Figs 2B-2C;2F;1D-3). Re claim 23, wherein a single row of connectors 110',110 is formed around perimeter of the leadframe (Figs 2F,2B,1D-2). Re claim 24, wherein the metal frame comprise a metal sheet by metal deposition (Fig 2A; col 5, lines 26-45). Re claim 25, wherein multiple rows of connectors 110,110' are formed around a peripheral of the metal sheet (Figs 1D-3, 2B,2F; col 4, lines 1-31). Re claim 26, wherein the removable material 100,100' covers substantially the entire bottom surface of the metal lead frame (Figs 2A-2F,1C-1E). Re claim 27, wherein the electronic device 120' is coupled to the die attach pad 115' via a conductive epoxy (Fig2C,1C; col 5, lines 35-45; col 4, lines 32-45).

Claim Rejections - 35 USC § 103

3. Claims 7-8 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fjelstad (6,001,671), as applied to claims 1-6,16,20-26,27 above, taken with Wyland (6,111,199) and Weng et al (5,972,234).

Fjelstad '671 teaches a method for forming a package for an electrical device as applied to claims 1-6,16,20-26,27 above.

Re claims 7-8,17, Fjelstad already teaches (at col 3, lines 55-67) the removable sacrificial material 100,100' comprising a polymer material including polyimide, wherein the polymer sheet 100' is removed by chemically etching. However, Fjelstad lacks mentioning, in claim 7,

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the removable material comprising a water soluble adhesive; in Claim 8 removing the removable material with deionized water; and in Claim 17 the removable material comprising polyimide and water soluble adhesive.

However, *Wyland et al* teach (at col 8, lines 1-10; col 7, lines 54-67) forming a removable adhesive resin film on a substrate, wherein polyimide, alkali-soluble resin, or water-soluble resin are alternatively used for forming the adhesive resin film. *Weng* teaches (col 5, lines 34-37,27-51; and col 4, line 25 through col 5, line 51) the removable material for electronic device comprises a polymeric-base material and a water soluble adhesive, wherein removing the removable adhesive material is performed with deionized water (as a pure water).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the removable material Fjelstad by providing a water-soluble adhesive of resin and polyimide, as taught by Wyland and Weng. This is because the substitute art recognized equivalent removable materials, as alternative materials, is within the level of one of ordinary skill in the art, wherein water-soluble resin material or polyimide are highly adhesive to the terminals of the lead frames, wherein, by using water soluble resin/adhesive, removing the removable materials can be easily and conveniently performed with water, as further taught by Weng, and less expensive, wherein with the use of deionized water, as a high purity water, ion contamination of the device is prevented and thereby improving reliability and quality.

4. Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fjelstad (6,001,671) taken with Roche et al (4,530,152).

Fjelstad '671 teaches (at Figs 2A-2E,2F, col 5, lines 26-65; Figs 1A-1G-1,1D-3; col 1-5; col 3, line 53 through col 5) a method for forming a package for an electrical device, the method comprising the steps of attaching a removable material (100',115' in Fig 2A; 100 in Fig 1) to a surface of a conductive material 101 (Fig 2A; col 5, lines 26-65) before one or more isolated conductive features 110' have been formed within the conductive material (Fig 2B); forming isolated conductive features (110' in Figs 2B,2F; 110 in Figs 1B,1D-3) within said conductive material; attaching encapsulant (140' in Fig 2D; 140 in Fig 1E) to the isolated conductive features 110',115',110 and the removable material, wherein the attaching step is performed

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before a singulation process is performed to separate the package; and removing the removable material from the conductive features 110', 115', 110 and the encapsulant (Figs 1E-1F; col 4, line 66 through col 5; Fig 2F, col 5, lines 60-65; Fig 2E, col 5, lines 45-65).

Re claim 28, Fjelstad already teaches removing the removable material from the conductive features 110', 115', 110 and the encapsulant (Figs 1E-1F; col 4, line 66 through col 5; Fig 2F, 2E, col 5, lines 60-65; 45-65), but lacks mentioning to remove the removable material after the singulation process.

However, Roche teaches removing the removable sacrificial material from the conductive features 2 and the encapsulant 5 (col 3, line 62 through col 4, line 25), wherein the removing the material step can be performed before or after the singulation process for separating the package (col 4, lines 20-25).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to remove the removable material of Fjelstad either after a singulation process to separate the package or prior to a singulation process as alternatively taught by Roche. This is because removing the removable material either after or prior to the singulation process are alternative and art recognized equivalent processes for substitution in fabrication of the electronic device, and because of the desirability to expose a portion of the metal lead frame and conductive features for subsequent electrical connection, wherein by removing the removable material after singulation process, the removable material would still cover and thereby consequently protect the isolated conductive features and metal lead frame from being contaminated during singulation process.

Response to Arguments

*** The declaration filed on May 10, 2006 under 37 CFR 1.131 with the submitted the Innovation Disclosure showing the date on September 22, 1998 is sufficient to overcome the references of Yamaguchi (6,166,430) and Glenn (6,247,229), since Applicant swears behind the effective filing date of the references of Yamaguchi (6,166,430) and Glenn (6,247,229).

** Applicant's amendment and remarks filed May 10, 2006 have been fully considered but they are moot in view of the new ground(s) of rejection.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael M. Trinh whose telephone number is (571) 272-1847. The examiner can normally be reached on M-F: 9:00 Am to 5:30 Pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Zandra Smith can be reached on (571) 272-2429. The central fax phone number is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).
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Michael Trinh
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